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Parents' personality and parenting stress in families of children with spina bifida

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Abstract

Background Spina bifida (SB) can place parents at risk for increased levels of parenting stress. Little is known, however, about the role of parents' intrapersonal resources. Therefore, based on ideas of the Disability-Stress-Coping Model, relations between the severity of SB, parents' personality traits and parenting stress were examined.

Methods Forty-six mothers and 37 fathers of children with SB (6–14 years) participated. Severity of SB (physical dysfunctions and cognitive functions), parental personality (Big Five) and parenting stress (Parenting Stress Index) were measured. Multiple regression analyses were performed.

Results The severity of the child's physical dysfunctions was positively associated with parenting stress. Extraversion (mothers only), emotional stability and agreeableness (fathers only) were negatively related to parenting stress. In the final model, 64% of the variance in mothers' and 67% of the variance in fathers' levels of parenting stress was explained. Parents' personality traits explained the largest proportions of variance in parenting stress.

Conclusion Mobility, bladder and bowel dysfunctions in school-aged children with SB represent ongoing stressors for parents. Parents' intrapersonal resources of positive affectivity, however, are more important determinants of parental adjustment to SB than the child's physical dysfunctions.

Spina bifida (SB) covers a wide array of spinal cord malformations. It is also the second most common congenital disorder worldwide (Mersereau *et al.* 2004). Depending on the type of malformation (closed vs. open), its location on the spine (sacral, lumbar or thoracic) and the comorbidity of hydrocephalus, brain injuries and orthopedic deformities, children with SB live with a range of functional impairments, including weakness or paralysis of the legs, bladder incontinence, bowel obstipation and cognitive deficits (Mitchell *et al.* 2004).

Chronic disorders, such as SB, entail important life events that have a powerful and sudden impact (e.g. diagnosis and high-risk surgery) as well as repetitive, daily hassles that have minor but chronic impacts (e.g. medication intake, incontinence and ambulation problems). Theoretically, both types of events can be viewed as sources of stress for the affected child and his or her family (Lazarus & Folkman 1984). Raising a child with SB can thus place substantial demands on parents (Wallander & Varni 1998). Moreover, parenting a child with an ongoing paediatric illness can generate a chronic type of stress that is both more enduring than major life events and more intense than daily hassles (Quittner *et al.* 1990).

Overviews of the research literature reveal that SB has a negative impact on parents' psychological functioning (Vermaes *et al.* 2005; Holmbeck *et al.* 2006). Moreover, SB-related events particularly affect parents' well-being in the child-rearing domain, meaning that they feel less satisfied and confident as a

parent than other parents (Vermaes *et al.* 2005; Holmbeck *et al.* 2006). Finally, there is beginning evidence suggesting that mothers are more at risk for parenting stress than fathers, because they are often the primary caregiver (Kazak & Marvin 1984). However, more studies on fathers are needed to confirm this (Vermaes *et al.* 2005; Holmbeck *et al.* 2006; Vermaes *et al.* 2007).

Despite the increased risk for parenting stress, there is also considerable variability in the ways that children's health conditions affect parents (Wallander & Varni 1998). Not all parents of children with SB experience psychological distress within the clinical ranges (Vermaes *et al.* 2005) or increased levels of parenting stress (Kazak & Marvin 1984; Chavkin 1986; Holmbeck *et al.* 1997). The Disability-Stress-Coping Model provides a theoretical framework for understanding this variability (Wallander & Varni 1998). In this model, parents' psychosocial adjustment is hypothesized to depend on multiple factors of risk and resistance. Risk factors refer to the severity of the child's disability/disease, functional care strain and other psychosocial stressors (e.g. life events and daily hassles). Resistance factors encompass social-ecological resources, intrapersonal resources and stress-coping processes.

Studies on resistance factors of parents' psychosocial adjustment to SB have mainly focused on social-ecological factors (i.e. social, familial and marital support) and have dedicated little attention to parents' intrapersonal resources (Vermaes *et al.* 2005; Vermaes *et al.* 2007). Based on the parenting literature, though, it can be argued that intrapersonal resources play an important role in determining levels of parenting stress. According to Belsky and colleagues (Belsky 1984; Belsky & Barends 2002; Vondra *et al.* 2005), parental personality is the most important determinant of parenting. Psychological maturity is needed to be able to take perspective of others, to control impulses, to feel secure in one's own live and to find ways to have one's needs met. These conditions facilitate parental nurturance and firmness, even in response to difficult child behaviour. Mature personality characteristics are also thought to protect parents from being overwhelmed by special child-care demands (Belsky & Barends 2002).

Parental personality can be conceptualized in terms of traits. Traits refer to relatively consistent patterns of thoughts, feelings or behaviours. Studies on personality traits have yielded five higher-order dimensions along which differences among individuals can be described: extraversion, emotional stability, agreeableness, openness to experience (or intellect) and conscientiousness (Goldberg 1992). Extraversion versus introversion reflects one's quantity and intensity of interpersonal interactions, activity level and capacity for joy. Emotional stability versus neuroticism refers to a person's emotional balance and resistance to psychological challenges. Agreeableness reflects an individual's interpersonal orientation ranging from antagonism to compassion in thoughts, feelings and actions. Openness refers to one's tendency to enjoy new experiences, to have broad interests and to be imaginative. Finally, conscientiousness reflects a person's high standards for achieving goals and being well-organized.

Several studies provided empirical support showing that personality traits play an important role in determining levels of parenting stress. Parents with higher levels of extraversion, emotional stability and agreeableness were found to have lower levels of parenting stress (Belsky & Barends 2002; Mulsow *et al.* 2002; Vondra *et al.* 2005).

Given the above, the purpose of this study was to examine the role of intrapersonal resources in parents' psychosocial adjustment to SB. Four hypotheses were studied in a sample of mothers and fathers of school-aged children with SB. First, parents – mothers more than fathers – of children with SB were expected to experience higher levels of parenting stress than parents in non-clinical reference groups. Second, the severity of the child's SB dysfunctions was expected to be associated with increased levels of parenting stress. Third, parents' intrapersonal resources (i.e. personality traits) were expected to be associated with lower levels of parenting stress. Fourth, parents' intrapersonal resources were expected to be stronger determinants of parenting stress than children's SB dysfunctions.

Methods

Participants

This study was part of the Nijmegen Interdisciplinary Spina Bifida (NISB) research programme. Participants were 46 mothers (M age = 39.15, SD = 4.02) and 37 fathers (M age = 41.65, SD = 4.57) of 46 children with SB (28 girls; M age = 10.36, SD = 2.38, range 6–14 years). The diagnosis SB was based on clinical and magnetic resonance examination within the first week of life. Criterion for diagnosis was the presence of a congenital defect of closure of one or more vertebral arches in combination with a median skin defect and cystic or lipomatous lump of the back, and/or a developmental anomaly of the spinal cord confirmed by magnetic resonance imaging. In this sample, 12 children had closed SB (ICD-10 code Q76.0) and 34 children had open SB (ICD-10 code Q05). The lesion level of neurologic impairments of the lower part of the body was scored as the uppermost affected spinal segment with decreased sensitivity and/or decreased intentional movement (Maynard *et al.* 1997).

Sensitivity was defined as behavioural reactions on pin prick and light touch. Intentional movement was defined as non-stereotypical, non-reflex movement. In terms of Verhoef's classification (Verhoef *et al.* 2004), 16 children (35%) had mild lesions (segments S1–S5), 22 children (48%) had medium lesions (segments L3 to L5) and eight children (17%) had severe lesions (segments L2 and above). Comorbidity of hydrocephalus (ICD-10 code Q03) was 70% ($n = 32$) and Chiari II malformation of the cerebellum (ICD-10 code Q07) was also 70% ($n = 32$).

As regards demographic information, 43 children lived in two-parent families and three children lived with one parent. Family sizes varied from one to five children per family (M = 2.48, SD = 0.96). The child's place in birth order ranged from first to fourth born (M = 1.78, SD = 0.84). All children had Dutch parents, except one child whose father was Turkish. On the International Standard Classification of Education (0 = low, 6 = high) (UNESCO 1997), mothers' mean level was 3.87 (SD = 0.73) and fathers' mean level was 4.29 (SD = 0.87). All families had incomes from employment; 27 families from one earner and 19 families from dual earners. On average, mothers worked 18.48 (SD = 10.06, $n = 20$) and fathers worked 39.59 (SD = 7.14, $n = 34$) h per week in paid jobs. Four mothers and two fathers were (temporarily) incapacitated for work.

Procedure

After approval of the NISB study by the Regional Committee on Human Research (CMO no. 2002/187) families were asked by mail to participate. Families were included if: (1) the child had been diagnosed with SB; and (2) the child had been born at, or referred to the Radboud University Nijmegen Medical Center. Fifty-eight families (75%) agreed and signed an informed consent. At the centre, a graduate-level neuropsychologist (AV) tested the children's cognitive functions while at the same time a graduate-level family psychologist (IV) interviewed their parents. After the interview, parents filled out a battery of standardized questionnaires at home (response rate = 61%). The non-response group only differed from the study sample on ethnic background. Turkish and Moroccan parents were under-represented in the study sample because of language problems.

Materials

Physical dysfunctions The severity of SB was operationalized as physical dysfunctions, because the extent to which children with SB can independently participate in everyday activities has been found to be a better predictor of the expected demands on parents than the structural SB injuries (McCormick *et al.* 1986). Moreover, in SB, children's sensory and motor levels of functioning do not always correspond with the anatomical levels of the bony spinal defect (Mitchell *et al.* 2004). In addition, extensive histories of surgery can obscure the association between structural impairments and functional outcomes (Verhoef *et al.* 2004). Therefore, information about the child's physical dysfunctions was obtained. Parents were asked to indicate how much difficulties their child had with bladder, bowel and ambulatory functions. Bladder functioning was coded: 0 = normal, 1 = moderate urine incontinence requiring the occasional use of a napkin or change of clothes, 2 = severe urine incontinence requiring permanent use of napkins and/or catheterization. Bowel functioning was coded: 0 = normal, 1 = moderate problems of incontinence requiring scheduled toileting and the occasional use of napkins, or reduced bowel movements leading to obstipation requiring the use of oral laxatives, 2 = severe problems of permanent incontinence or complete absence of bowel movements leading to obstipation requiring manual evacuation, retrograde rectal enema, antegrade colonic evacuation or a stoma. Ambulatory functions were coded using Hoffer's criteria (Hoffer *et al.* 1973): 0 = ambulator, able to walk normally; 1 = community ambulator, able to walk indoors and outdoors with assistance of braces and/or crutches, 2 = household ambulator, able to walk indoors and with an apparatus, 3 = non-functional ambulator, able to walk in a therapy session, 4 = non-ambulator, not able to walk at all. The three scores were sufficiently interrelated (Spearman's Rho[bladder,ambulation] = 0.53, Rho[bowel,ambulation] = 0.54, Rho[bladder,bowel] = 0.88) to combine them into a composite sum score of physical dysfunctions (range: 0 = no impairments, 8 = severe impairments; Cronbach's alpha = 0.76).

Cognitive functioning The Wechsler Intelligence Scale for Children (WISC-III) (Wechsler 1997) was used to assess children's cognitive functioning. The WISC-III is a general intellectual assessment battery for children in the ages of 6 to 16 years. The test comprises six verbal and seven performance subtests which can be combined into a global Full Scale Intelligence Quotient (FSIQ).

Parents' personality The Quick Big Five (QBF) (Vermulst & Gerris 2005) was used to measure parents' personality. This questionnaire consists of 30 unipolar markers with a 7-point Likert scale (1 = not at all me, 7 = totally me) and is an adaptation of Goldberg's Big Five personality markers (Goldberg 1992). It assesses the Big Five personality traits: extraversion (six

items; Cronbach's alpha = 0.85; e.g. 'talkative'), emotional stability (six items; alpha = 0.87; e.g. 'calm'), agreeableness (six items; alpha = 0.80; e.g. 'sympathetic'), openness to experience (six items; alpha = 0.84; e.g. 'imaginative') and conscientiousness (six items; alpha = 0.91; e.g. 'organized'). The criterion validity, test–retest reliability and internal consistency of the QBF have been well established in previous studies (Vermulst & Gerris 2005). Mothers and fathers completed the QBF for themselves and for their partner. The associations between the self- and partner reports were moderately high ($r = 0.47$ for mothers' personality; $r = 0.53$ for fathers' personality). Hence, the self- and partner-reported mean scores could be combined to obtain a multiple-respondent assessment of personality.

Parenting stress Parents completed three subscales (role restriction, competence and isolation) from the Dutch version of the Parenting Stress Index (PSI) (Abidin 1995). The Dutch PSI is a reliable 120-item (4-point Likert scale) questionnaire designed to assess dysfunctions in the parent–child relationship for parents of children up to 14 years (De Brock *et al.* 2006). Norm scores from non-clinical reference groups of 927 mothers and 864 fathers of children between 2–14 years are available (De Brock *et al.* 2006). Role restriction consists of six items (alpha = 0.81; e.g. 'I often feel that my child's needs dominate my life'), competence of eight items (alpha = 0.86; 'I don't think that I am as good a parent as other parents') and isolation of six items (alpha = 0.74; 'Since I have this child, I have lost touch with my friends'). Higher sum scores reflect higher levels of parenting stress. A total score for parenting stress was obtained by summing up the subscale items (20 items; range: 20–80; alpha = 0.94). The selection for the three subscales was based on previous studies on parents of children with SB (Greenley *et al.* 2006).

Plan of analysis

Analyses were conducted for mothers and fathers separately. To test hypothesis 1, parents' PSI subscale scores were compared with the Dutch norm scores with Student's *t*-tests and Hedges *d* effect sizes. Cohen's guidelines were used for the interpretation of *d*: $d \geq 0.2$ (small effect), $d \geq 0.5$ (medium effect) and $d \geq 0.8$ (large effect) (Cohen 1988). For hypotheses 2 to 4, multiple regression analyses were conducted. The criterion variable for all models was the PSI parenting stress score. First, separate regression equations were formed for hypotheses 2 and 3 to reduce the number of predictors. The unique contribution of each predictor variable was tested by pulling each variable singly out of the equation and examining R^2 *change* with the other predictors remaining in the regression equation. Predictors were eliminated if they did not reach significance ($P < 0.05$). In the final model (hypothesis 4), background variables (parental age, educational level and working hours/week) were entered in the first step as covariates, followed by the remaining variables of interest in the next steps.

Results

Preliminary analyses, descriptive data and comparisons

Most variables were normally distributed. Positive square-root transformations were performed to normalize the skewed distributions of physical dysfunctions and parenting stress. Table 1 displays the descriptive statistics of children's physical dysfunctions and parents' parenting stress scores. As can be seen, more than half of the children had severe bladder and bowel dysfunctions. Further, only a third of the children had normal ambulatory functions. The mean score on the physical dysfunctions composite was 4.87 (SD = 2.95). Further, *F*-tests showed that parenting stress varied significantly as a function of the child's bladder dysfunctions (mothers), bowel dysfunctions (fathers) and ambulation problems (mothers and fathers). Levels of parenting stress thus tended to be higher if physical dysfunctions were severer. Regarding children's cognitive functioning, the average FSIQ score was 81.68 (SD = 19.35), which is common in populations of children with SB (Fletcher *et al.* 2004).

In Table 2, parents' PSI subscale scores and norm scores of the non-clinical reference groups are shown. Mothers in this study felt more restricted by their parenting role, less competent as a parent and more socially isolated than mothers in the reference group. Fathers in this study only differed from the reference group of fathers in that they felt more restricted by their parenting role. All the effect sizes for mothers were higher than for fathers; however, paired *t*-tests showed that mothers and fathers only significantly differed from each other on the competence subscale ($t = 2.12$, $P < 0.05$).

Correlational analysis

Table 3 depicts Pearson's correlations *r* among physical dysfunctions, cognitive functioning, personality and parenting stress. The correlations for mothers are shown above the diagonal and for fathers below the diagonal. As expected, the more severe the child's physical dysfunctions the higher parents' levels

Table 1. Children's physical dysfunctions and parenting stress

	Parenting stress							
	Frequency		Mothers			Fathers		
Physical dysfunctions	***n***	**%**	**M**	**SD**	***F*-test**	**M**	**SD**	***F*-test**
Bladder					4.75**			2.39
Normal functioning	12	26.1	29.00	7.62		25.60	4.25	
Moderate incontinence	5	10.9	25.00	5.96		29.25	7.14	
Severe incontinence	29	63.0	36.98	11.26		32.45	9.62	
Bowel					1.11			2.92*
Normal functioning	9	19.6	29.44	7.67		24.86	2.19	
Moderate problems	10	21.7	32.40	12.58		27.57	6.53	
Severe problems	27	58.7	35.43	10.97		32.73	9.54	
Ambulation†					6.85***			2.59*
Ambulator	14	30.4	25.57	5.80		25.69	4.55	
Community ambulator	4	8.7	34.38	5.65		35.33	14.57	
Household ambulator	9	19.6	30.33	7.89		28.43	5.88	
Non-functional ambulator	1	2.2	31.00	–		28.00	–	
Non-ambulator	18	39.1	41.44	11.21		35.00	9.80	

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

†Ambulator, child is able to walk normally; community ambulator, child is able to walk indoors and outdoors with assistance of braces and/or crutches; household ambulator, child is able to walk indoors and with an apparatus; non-functional ambulator, child is able to walk in a physiotherapy session; non-ambulator, child is not able to walk at all.

Table 2. Group comparisons for the Parenting Stress Index (PSI)

	Mothers						Fathers					
	Spina bifida (*n* = 46)		Norm scores (*n* = 927)				Spina bifida (*n* = 37)		Norm scores (*n* = 864)			
PSI parent domain	**M**	**SD**	**M**	**SD**	**Student *t***	**Hedges *d***	**M**	**SD**	**M**	**SD**	**Student *t***	**Hedges *d***
Role restriction	12.2	4.5	10.5	3.5	2.53*	0.48	11.1	3.6	9.6	3.3	2.49*	.45
Competence	12.2	4.7	10.3	3.7	2.70**	0.51	10.3	3.6	9.8	3.3	0.90	.15
Isolation	9.2	3.0	8.3	2.5	2.00*	0.36	8.9	2.7	8.2	2.7	1.54	.26

*$P < 0.05$, **$P < 0.01$.

Table 3. Correlations among physical dysfunctions, cognitive functioning, personality traits and parenting stress

	Mothers (*n* = 46)							
Fathers (*n* = 37)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Physical dysfunctions		–0.68**	–0.27	–0.18	0.17	–0.02	0.15	0.55**
2. Cognitive functioning	–0.68**		0.12	0.22	0.07	0.20	–0.21	–0.29
3. Extraversion	0.06	–0.03		0.36*	0.32*	0.24	–0.22	–0.56**
4. Emotional stability	0.14	–0.01	0.45**		0.05	–0.08	–0.13	–0.55**
5. Agreeableness	0.26	0.12	0.33*	0.06		0.14	0.27	–0.21
6. Openness	–0.02	–0.10	0.29	–0.09	0.45**		0.11	0.19
7. Conscientiousness	0.13	0.08	–0.04	–0.18	0.24	0.23		0.09
8. Parenting stress	0.46**	–0.29	–0.39*	–0.57**	–0.48**	–0.16	0.01	

*$P < 0.05$, **$P < 0.01$.

of parenting stress. Children's cognitive functioning, however, did not relate significantly to parenting stress. Importantly, parents who tended to be more emotionally stable and extravert also had lower levels of parenting stress. Fathers' level of agreeableness was also associated with lower levels of parenting stress.

Regression analyses

In hypothesis 2, the severity of the child's physical dysfunctions was expected to be a risk factor of parenting stress. Table 4 depicts the unique contributions of SB dysfunctions to the variances in mothers' and fathers' levels of parenting stress. Physical

Table 4. Multiple regressions: unique contributions of the child's physical dysfunctions and parents' personality traits to parenting stress

	Mothers ($n = 46$)		Fathers ($n = 37$)	
	R^2 change	F change	R^2 change	F change
Parenting stress				
Physical dysfunctions	0.25	13.57***	0.18	6.97*
Cognitive functioning	0.01	0.85	0.01	0.21
Full model	0.33	9.17**	0.26	5.11*
Parenting stress				
Extraversion	0.16	4.43*	0.00	0.05
Emotional stability	0.11	9.28**	0.19	11.86***
Agreeableness	0.00	0.19	0.16	10.14**
Openness	0.08	6.57*	0.01	0.88
Conscientiousness	0.01	0.53	0.00	0.02
Full model	0.54	9.24***	0.53	6.84***

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Table 5. Hierarchical multiple regressions: determinants of parenting stress

	Mothers ($n = 46$)		Fathers ($n = 37$)	
	Beta	R^2 change	Beta	R^2 change
Model 1		0.01		0.09
Step 1: age	0.07		0.09	
Step 1: educational level	0.10		0.20	
Step 1: working hours/week	–0.10		–0.10	
Model 2		0.28**		0.16*
Step 1: age	0.00		0.13	
Step 1: educational level	0.04		0.17	
Step 1: working hours/week	–0.08		–0.01	
Step 2: physical dysfunctions	0.54***		0.38*	
Model 3		0.35***		0.42***
Step 1: age	0.07		0.11	
Step 1: educational level	0.14		0.21	
Step 1: working hours/week	–0.04		–0.13	
Step 2: physical dysfunctions	0.27*		0.25*	
Step 3: extraversion	–0.37**			
Step 3: emotional stability	–0.40***		–0.57***	
Step 3: agreeableness			–0.35**	
Step 3: openness	0.22			
Multiple R^2		0.64***		0.67***

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

dysfunctions contributed uniquely to parents' levels of parenting stress, but cognitive functioning did not.

In hypothesis 3, we predicted that parents' personality traits would protect parents from experiencing high levels of parenting stress. For both mothers and fathers, emotional stability was the strongest negative contributor (see Table 4). Further, mothers' levels of extraversion and openness to experience, and fathers' levels of agreeableness explained unique proportions of variance in parenting stress.

Finally, for hypothesis 4, we tested whether the personality traits extraversion (mothers), openness (mothers), emotional stability and agreeableness (fathers) were stronger determinants of parenting stress than the child's physical dysfunctions, after controlling for demographic background variables. In Table 5, three hierarchical multiple regression models are depicted. The final models for mothers ($F(7,39) = 11.65$, $R^2 = 0.64$, $P < 0.00$) and fathers ($F(6,31) = 18.44$, $R^2 = 0.67$, $P < 0.00$) were quite similar. Parental age, educational level and working hours in paid jobs failed to contribute significantly to the variations in parenting stress. The severity of the child's physical dysfunctions explained 17% of the variance in mothers' and 13% of the variance in fathers' levels of parenting stress, above and beyond the background variables. Yet, personality traits – especially emotional stability – were stronger, explaining 35% and 42%.

Parenting stress thus appeared to depend more on parents' intrapersonal resources than on the severity of the child's SB dysfunctions.

Discussion

The purpose of this study was to examine the role of intrapersonal resources in parents' psychosocial adjustment to SB. The characteristics of our sample were representative of SB populations in epidemiological studies (Verhoef *et al.* 2004). Most children had lesions at the lumbar level, 70% had hydrocephalus and the mean IQ was around 80.

As regards the four hypotheses, the first hypothesis was partly supported by the data. In line with earlier studies (Kazak & Marvin 1984; Holmbeck *et al.* 1997), parents – particularly mothers – of children with SB tended to have higher levels of parenting stress than parents of typically developing children. Mothers felt less competent than fathers. Similar findings in other studies have been explained in terms of the 'specialized role division' hypothesis (Kazak & Marvin 1984). To this view, traditional work–family divisions are more common in families of children with chronic illnesses than in other families, because such a specialization in roles facilitates efficient handling of the child's special needs. The downside, however, is that the primary caregiver, usually the mother, is continuously exposed to illness-related demands, which places her at increased risk for parenting stress. In our study, the absence of an association between the number of working hours in paid jobs and parenting stress, however, suggests that exposure alone does not explain gender differences in parenting stress. Possibly, mothers are more vulnerable to feeling less competent as a parent than fathers, because the image of being a parent is more strongly embedded in the identity of women than of men (Bugental & Goodnow 1998). Moreover, in current Western societies, mothers are confronted with two contradictory images of 'good' motherhood. On the one hand, they are expected to be sensitive and highly involved in child care; on the other hand, they are expected to be self-reliant and highly involved in a working career (Hayes 1996). Therefore, mothers in general, including mothers of children with SB, may experience more doubts about their competence as a parent than fathers. More research on work–family issues in families of children with paediatric conditions is needed to fully understand these gender differences.

The second hypothesis was also partly confirmed. The child's physical dysfunctions had a negative impact on parents' well-being, whereas limitations in cognitive functioning did not. One explanation may be that cognitive limitations interfere more with functioning in the academic context than in the family environment. The child's mobility, bladder and bowel dysfunctions have direct consequences for the child's participation in day-to-day activities and social relationships. Clinical experience (Erickson & Lynne 2004) illustrates that life in families of children with SB is restricted by the child's needs of assistance with mobility and the length of time needed for basic activities, such as intake of medication, urine catheterization and management of defecation. From a developmental perspective, middle childhood represents a period in which the responsibilities for the child's personal care need to be transferred from the parents to the child, as much as possible. This transition is often accompanied by parental fears that the child will suffer irreversible physical damage if she or he does not appropriately attend to these responsibilities (Erickson & Lynne 2004).

As regards hypothesis 3, extraversion (mothers), emotional stability and agreeableness (fathers) were found to explain lower levels of parenting stress in parents of children with SB. Based on the literature, we expected that all three personality traits would be associated with lower levels of parenting stress in both mothers and fathers; however, this appeared not to be the case. Possibly, the statistical power of this study was too small for all relationships to reach significance. On the other hand, extraversion and agreeableness may not have contributed independently to the variance in parenting stress in both mothers and fathers because of multicollinearity with emotional stability (Condition Indexes > 30). With regard to the relationships among extraversion, emotional stability and agreeableness, several authors have suggested that these personality traits should be regarded as indicators of the higher-order construct of positive affectivity (DeNeve & Cooper 1998). Emotional stability has also been identified as the strongest predictor of positive affectivity, meaning that individuals with higher levels of emotional stability make more positive attributions about themselves, others and life events causing them to experience higher levels of subjective well-being (DeNeve & Cooper 1998). Generally, personality traits are viewed as relatively stable over time, but not entirely unchangeable. Personality traits are thought to be shaped by genetic predispositions and by experiences in prior intimate relationships which are represented in deeply rooted cognitive schemas (Vondra *et al.* 2005). Parents' positive affectivity may thus function as a linchpin through which both genetic factors and earlier experiences indirectly affect their levels of parenting stress.

The fourth hypothesis was confirmed; personality traits were stronger determinants of parenting stress than the child's physical dysfunctions, meaning that intrapersonal resources have the potential of counterbalancing the negative impact of the child's

physical dysfunctions. In our final model, 64% and 67% of the variation in mothers' and fathers' levels of parenting stress was explained. Hence, we identified important risk and resistance factors.

Overall, this study contributed to the empirical basis of the Disability-Stress-Coping Model (Wallander & Varni 1998). It added new information to the existing body of research on the protective role of social-ecological resources (i.e. social, familial and marital support), by providing beginning evidence for the protective role of intrapersonal resources in parental adjustment to having a child with severe physical impairments.

In this study, however, we did not test moderating or mediating effects of risk and resistance factors, because the small sample size lacked sufficient statistical power. Future studies may move this field forward by examining whether resistance factors also buffer (i.e. moderate) the negative impact of children's physical impairments on parents' psychosocial adjustment. Moreover, the examination of mediational models may enrich our understanding of protective mechanisms. For example, the relation between intrapersonal resources and psychosocial adjustment can be expected to be mediated by socio-ecological resources. Several studies have shown that individuals with high levels of positive affectivity socialize more often and maintain more and higher quality social ties than individuals with low levels of positive affectivity (Pressman & Cohen 2005). Hence, the access to social support may, in part, depend on parents' intrapersonal resources.

Finally, the methodological strengths of this study included the theory-driven research questions, the inclusion of fathers and the use of multiple informants for the assessment of parents' personality. Inevitably, the study also had its methodological limitations. The design was cross-sectional, meaning that studies with longitudinal designs are needed to test and verify the theoretically assumed causal directions of this study. Further, the number of respondents – particularly fathers – was small.

Clinical implications

Professionals who are involved with families of school-aged children with SB (e.g. social workers, nurses, general practitioners and paediatricians) should be alert to parents' accounts and signs of persisting stress. These parents should be encouraged to seek psychological assistance in the first line, not only because parents of children with SB need a long breath to face the ongoing demands, but also because the results of this study suggest that parenting stress may be associated with a long trajectory of personality shaping that extends beyond the SB experience.

If parenting stress is confirmed through psychological assessment, the results of previous studies (Vermaes *et al.* 2005, 2007) and this study begin to suggest that the psychologist practitioner should explore three types of hypotheses. First, the severity of the child's physical impairments and psychosocial stressors engendered by SB. Second, the possible lack of sufficient socio-ecological resources. Third, low levels of positive affectivity.

If the latter hypothesis should be confirmed, research suggests that this lack of positive affectivity may be associated with parents' internal working models of prior experiences in relationships (Vondra *et al.* 2005). Evidence-based types of psychotherapy directed at identifying, explicating and modifying such working models may therefore be a promising route to releasing persistent levels of parenting stress.

Conclusion

In this study, several hypotheses of the Disability-Stress-Coping Model (Wallander & Varni 1998) were tested. The results showed that mothers of children with SB had higher levels of parenting stress than mothers of typically developing children. The severity of the child's physical dysfunctions was found to place parents at further risk for parenting stress. Parents' intrapersonal resources of positive affectivity, however, appeared to be strongly related to lower levels of parenting stress, meaning that they have the potential of enhancing parental adjustment to SB.

Key messages

- Parents of children with spina bifida feel more socially restricted than other parents.
- More research on work–family balance in families of children with paediatric conditions is needed to understand differences in levels of maternal and paternal stress.
- Intrapersonal resources may have a strong potential of protecting parents of children with spina bifida from parenting stress.
- Parenting stress may be associated with a long trajectory of personality shaping that extends beyond the spina bifida experience.
- Psychologist practitioners should explore three contributing factors when working with parents of children with spina bifida who suffer from high levels of parenting stress.

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